Math 286(homog, 2.6-2.7) Hw 4 Name & Box number:

1. Solve the differential equation: $\dfrac{dy}{dx} = \dfrac{x^2 + 3y^2}{2xy}$

2. Determine whether the following is exact or not. If it is exact, find the solution.

(a) $(2x + 4y)dx + (2x - 2y)dy = 0$

(b) $(2xy^2 + 2y)dx + (2x^2 y + 2x)dy = 0$

(c) $(e^x \sin y + 3y)dx - (3x - e^x \sin y)dy = 0$

(d) $\dfrac{dy}{dx} = \dfrac{xy^2 - \cos x \sin x}{y(1 - x^2)}, \; y(0) = 2$

3. Find the value of b for which the given DE is exact, and then solve the equation.

$(ye^{2xy} + x) + bxe^{2xy} y' = 0$

4. Find an integrating factor and solve the given DE.

$[4(x^3 / y^2) + (3 / y)]dx + [(3(x / y^2) + 4y)]dy = 0$

5. Consider the initial value problem given below. Use Euler's method to obtain an approximation value of $y(1.5)$ using first $h = 0.1$.

$y' = 0.2xy, \; y(1) = 1$

6. Consider the initial value problem given below. Use Euler's method to obtain an approximation value of $y(2.6)$ using first $h = 0.2$.

$y' = 0.1\sqrt{y} + 0.4x^2, \; y(2) = 4$

7. Find the first order partial derivatives of the function.

(a) $f(x, y) = y^5 - 3xy$ (b) $z = (2x + 3y)^{10}$ (c) $f(x, y) = \dfrac{x - y}{x + y}$

(d) $f(r, s) = r\ln(r^2 + s^2)$ (e) $f(x, y) = \sin^2(mx + ny)$ (f) $f(x, y) = x^4 y^3 + 8x^2 y$